

VI. Range Of Potential Recharge Facility Needs

A. Circumstances That Will Affect Demand

1. Proposition 200 - The Water Consumer Protection Act

On November 6, 1995, the citizens of the City of Tucson approved Proposition 200, the Water Consumer Protection Act, which limits the ways in which the City's CAP allocation can be used. The proposition prohibits delivery of CAP water to potable water customers, unless the CAP water is treated to the same quality as Avra Valley groundwater for hardness, salinity and dissolved organic material. This can only be accomplished through advanced treatment, such as reverse osmosis. Because such techniques have never been applied at this scale, extensive engineering studies and pilot plant operation would be required prior to operation of an advanced treatment plant, should such a plant prove to be the community's choice. The Proposition was reaffirmed by the voters on November 4, 1997, when an alternative initiative controlling CAP water deliveries failed.

While advanced treatment studies are being conducted, the City is pursuing a recharge strategy that would allow it to comply with the provisions of Proposition 200 and meet its various water supply goals. This strategy would replace pumpage from the City's Central Wellfield with water recovered from the Central Avra Valley Storage and Recovery Project, a large recharge project under development in the central Avra Valley. If Tucson ceases pumping the Central Wellfield altogether, it will have to recharge and recover approximately 60,000 to 70,000 AF annually at CAVSARP. If the City also wants to bank water in its long-term storage account, it will have to find additional capacity at CAVSARP or elsewhere.

Tucson Water delivers an average of 120,000 AF annually to customers, of which approximately 8,000 AF is effluent. Deliveries are expected to increase to almost 170,000 AF by the year 2025, of which over 20,000 AF is expected to be effluent. If Tucson Water does not deliver CAP water directly to customers, then it will need to recharge substantial amounts of water to meet AWS requirements. On the other hand, if Tucson Water returns to direct delivery of CAP water, its demand for recharge capacity will be much lower. In that situation, recharge would be used primarily to protect against shortages, raise groundwater levels and prevent subsidence.

Although municipal providers outside of the City of Tucson and within the AMA are not directly affected by the Water Consumer Protection Act, they are affected by public reaction to events in Tucson. Other municipal providers also may choose to develop treatment facilities for direct delivery to customers in the future, if public perception of the quality of CAP water improves. Their need for recharge capacity would depend on this choice.

2. Use Of Groundwater Allowances

Under AWS rules, designated municipal providers and certificated subdivisions are granted limited groundwater allowances that they may use as they choose. For example, they may use up their groundwater allowance in the early years of operating under AWS rules, and use this time to

develop renewable supplies. Alternatively, they may save their groundwater allowance for future contingencies by using only renewable water in the early years. Even assuming that their renewable supplies will be primarily CAP water recharged at facilities near the canal (currently the least expensive option), uncertainty about how providers will choose to use their groundwater allowance introduces uncertainty into recharge demand estimates. Providers are not required to report how they plan to use their groundwater allowance, so credible predictions are difficult to make.

3. Price of Water

The price of alternative supplies of water will have an effect on the demand for recharge. As long as the cost of pumping groundwater is lower than the costs for obtaining other water supplies, there will be an incentive to use groundwater. The cost of pumping groundwater depends on several variables, including price of energy, lift (depth to water), aquifer characteristics (transmissivity), and pump characteristics (capacity and efficiency). Energy costs vary with the user; the lowest (subsidized) rates are available to some irrigation districts and the highest rates are paid by individuals. In the northwestern portion of the Tucson AMA, irrigation districts charge farmers in the range of \$30 to \$45 per acre-foot of groundwater. This charge includes operation, maintenance and repair (OM&R) costs. The average cost for pumping groundwater at the Kai Farm at Picacho (\$20 to \$25/AF) probably represents the low end for such costs. The costs for groundwater estimated for the ASARCO and Cyprus mines at the southern end of the AMA were \$88 and \$166, respectively, which probably represents the high end.

CAWCD sets prices for CAP water. M&I subcontractors are required to pay capital charges on their full allocation regardless of deliveries. In addition they are required to pay fixed OM&R charges and pumping energy costs for subcontract water that is delivered, and to pay fixed OM&R charges for subcontract water that is ordered but not delivered. In 1998, the capital charge was \$48/AF, the fixed OM&R charge was \$29/AF, and the pumping energy cost was \$36/AF for a total of \$113/AF. The capital charge is projected to rise to \$54/AF by the year 2000, while the energy and fixed OM&R costs will be determined annually. Excess CAP water is the volume remaining after all subcontract water is scheduled. Subcontractors may purchase specially priced excess CAP water under the incentive program if that water will be used to accrue long term storage credits. For 1998, incentive priced water is set at \$41/AF. M&I users who are not subcontractors may also purchase available excess water for \$113/AF in 1998, increasing to a projected cost of \$127/AF in 2002.

The demand for recharge storage credits is creating a category of water that is available to certain agricultural users at an even lower cost. Municipal providers are buying incentive-priced water and reselling it to GSFs at reduced prices, sometimes below \$5/AF, in exchange for storage credits. The cost per credit to the municipal providers in these arrangements is lower than other currently available recharge alternatives.

Total cost of reclaimed water produced by the City of Tucson's Sweetwater facility is \$650 to \$750/AF, of which \$100 - \$150 is the cost of production and the remainder pays for capital costs.

Reclaimed water is sold to most customers at a price of \$462/AF, making it an economically feasible alternative primarily for those customers whose current supply is potable water. The price for potable water is generally substantially higher.

B. Other Recharge “Demands”

1. Arizona Water Banking Authority

The AWBA estimates that in 1998 it will receive approximately \$1.4 million from the 4-cent tax in Pima County and an additional \$700,000 from groundwater withdrawal fees. For planning purposes, it assumes that the total funds from Pima County will remain approximately the same for its 10-year planning horizon at \$2.1 million per year. And, because there was much less AWBA storage in Pima County in 1997 than anticipated, there will be some unspent money from 1997 rolled forward for use in 1998.

The AWBA further assumes that CAP water will be available for it to purchase for recharge in Pima County. In 1997, the Bank paid \$36/AF to CAWCD for CAP water and received \$21/AF from farms and irrigation districts for in-lieu water at GSFs in the Phoenix and Pinal AMAs. The Bank paid \$13/AF, plus the water cost, to recharge directly at the Granite Reef Underground Storage Project (GRUSP) in the Phoenix AMA. The AWBA is able to buy more water for GSF recharge than for direct recharge due to the lower cost to recharge at GSF facilities.

In the Tucson AMA, storers other than the AWBA are offering CAP water to GSFs for less than \$5 to \$17/AF, a range much lower than the AWBA’s \$21/AF. As long as the AWBA adheres to its current pricing policy, GSF recharge in the Tucson AMA may not be feasible for the Bank. This situation needs to be re-evaluated if the AWBA intends to meet its own recharge goals. The amount of water the AWBA can recharge in the AMA using locally derived funds depends on how much it will cost the Bank to use the direct recharge facilities being developed here. In its Storage Facilities Inventory, the AWBA used an average cost range of \$50 to \$60/AF to estimate its annual need for recharge capacity. The AWBA paid \$58.50/AF (\$22.50/AF for facility costs and \$36/AF for water) to recharge in the Avra Valley Recharge Project (AVRP) in 1997. CAWCD raised the AWBA price for water by \$5/AF to \$41/AF for 1998. However, facility costs at AVRP dropped to \$15.00/AF in 1998, leaving the total cost of recharge to the AWBA at AVRP slightly lower in 1998 than in 1997. Increases in the price charged to the AWBA for water are likely in the near future to cover more of the actual costs associated with delivering CAP water. Therefore, an estimated range of \$50 to \$70/AF may be more appropriate for the average cost of recharge to the Bank in the Tucson AMA. Using this range, the \$2.1 million per year available for AWBA recharge in Pima County means that the Bank will need 30,000 to 42,000 AF of annual recharge capacity in the Tucson AMA. However, additional capacity will be needed to catch up with the previous years’ recharge needs.

In addition, preliminary discussions have been held with California and Nevada about banking water in Arizona. The Secretary of the Interior has issued draft rules concerning interstate banking that reinforce the role of the AWBA. Once these rules are finalized and

approved by the Director of ADWR, it is anticipated that some Colorado River water recharge, paid for by Nevada and/or California, could occur in the Tucson AMA. Water banked in Arizona would be “recovered” through a forbearance agreement, under which Arizona would refrain from taking a portion of its entitlement of Colorado River water equal to the amount of water to be recovered. This recovered water could then be withdrawn from the Colorado River by the state which had banked the water.

2. Indian Water

ADWR projects 15,800 AF of annual water demand for Indian agriculture on the San Xavier and Schuk Toak Districts in the Tucson AMA in the year 2025. Assuming this demand would be met by CAP water deliveries, 22,000 AF of Indian CAP allocation water would remain, some or all of which could be used for recharge. (This does not include any additional CAP water provided through SAWRSA.) The San Xavier District was given a Water Protection Fund grant to study the environmental impacts of CAP use, including recharge. The results of that study may guide decisions about recharge on the reservation. Although the San Xavier and Schuk Toak Districts and the Tohono O’odham Nation have been investigating options, they have not indicated their likely course of action. It is unlikely that they will decide to utilize capacity in off-reservation projects. On the other hand, the development of recharge facilities on-reservation may reduce the demand for off-reservation capacity if non-Indians are allowed to recharge water on the reservation. This will first require intergovernmental agreements regarding the accounting for long-term storage credits.

3. Southern Arizona Water Rights Settlement Act Effluent

By the terms of the SAWRSA Settlement, the Secretary of the Interior controls 28,200 AF of effluent to be exchanged for additional water for the San Xavier and Schuk Toak Districts of the Tohono O’odham Nation. The Settlement is also expected to limit the amount of groundwater the Districts are entitled to pump. An option that may be available to the Secretary for exchange is recharge of effluent to create credits that can be sold to pay for CAP or other water of quality suitable for agriculture. Other arrangements are possible that involve direct delivery of effluent to agriculture. This means that the Secretary’s effluent adds from 0 to 28,200 AF of demand for recharge capacity.